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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/867,563	05/31/2001	Tsu Shih	TS00-151	7575

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GEORGE O. SAILE & ASSOCIATES
28 DAVIS AVENUE
POUGHKEEPSIE, NY 12603

EXAMINER

CHEN, KIN CHAN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 06/10/2003

13

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/867,563

Applicant(s)

SHIH, TSU

Examiner

Kin-Chan Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 May 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 9, 11-21, 23 and 25-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-7, 11-21 and 25-27 is/are allowed.
- 6) ☒ Claim(s) 9, 23 and 28-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 9, 23 and 28-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US 6,042,999) in view of Wang et al. (US 6,057,239).

In a method for forming a dual damascene structure and protecting the substrate from damage caused by multiple etchings, Lin teaches (col. 4, line 41 through col. 6, line 30) providing a substrate having first and second insulative layers, separated from each other by an intervening etch-stop layer formed thereon; forming a hole opening through the first and second insulative layers; forming a fill material over the substrate, including in the hole opening; removing (e.g., etching) any excess fill material over the hole opening; forming a trench opening in the second insulative layer over the hole opening in the first insulative layer, thus completing the forming of the dual damascene structure on the substrate; removing the fill material from the hole opening (Fig.2f); depositing metal in the dual damascene structure and removing excess metal to complete the forming of the dual damascene (Figs 2a-2h).

Lin teaches fill material may be ARC, BARC, or organic BARC (col. 5, lines 36-38, 53-56). Therefore, it includes spin-on organic dielectric such as SiLK or FLARE because they are well-known ARC. Wang is relied on to teach this well-known feature.

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In a method of dual damascene process using sacrificial spin-on materials, Wang teaches a sacrificial layer of spin-on material, an anti-reflective coating (ARC) material such as FLARE (so-called spin-on organic oxide in instant claims 9 and 23) may be used for protecting the contact hole profile during the damascene etch process (col. 3, lines 9-14; col.1, lines 10-11). Hence, it would have been obvious to one with ordinary skill in the art to use said material as taught by Wang in the process of Lin in order to protect the contact hole profile during the damascene etch process.

Lin and Wang teach that performing the above process steps would protect the surface of the substrate from damage. The instant claims differ from Lin and Wang by specifying eliminating (without) volcano effect in dual damascene, however, since Lin and Wang teach the method claimed, the claimed property and function (such as eliminating volcano effect) is considered to be inherent.

Lin teaches that the dielectric layers may be materials, which are known in the art and not limited to silicon oxide materials. Therefore, the materials may include low-k dielectric because it is one of the most popular dielectric materials used in the art of semiconductor device fabrication.

The above-cited claims differ from the prior art by specifying well-known features (such as dielectric constant between 2.2 to 3.5 in claims 28 and 30) to the art of semiconductor device fabrication. A person having ordinary skill in the art would have found it obvious to modify the combined prior by adding any of same well-known features to same in order to provide their art recognized advantages and produce an

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expected result. It is noted that applicant did not traverse the aforementioned conventionality of features, which have been stated in the office action in Paper No. 6.

Response to Arguments

3. Applicant's arguments with respect to claims 9, 23, and 28-32 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Rodriguez et al. (US 5,821,160, col. 8, lines 54-56) teach All of conductive layers and dielectrics may be subjected to CMP at different stages of manufacturing; Badih, Fundamentals of semiconductor processing technologies (FSPT), pages 547 and 565-566, teaches that dielectric (insulators) materials include organic materials. Skee et al. (US 5,989,353; col. 3, lines 20-21) teach photoresist (so-called I-line photoresist in the instant claims) is a polymeric organic material; Tu et al. (cited in previous PTO-892, US 6,309,957; col. 3, lines 31-32, col. 4, lines 42-45) teach low-k material such as organic material may be planarized by CMP.

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

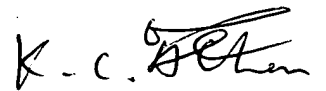
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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (703) 305-0222. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2934.

June 9, 2003.



Kin-Chan Chen
Primary Examiner
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